

EXERCISES

For more practice, see *Extra Practice*.

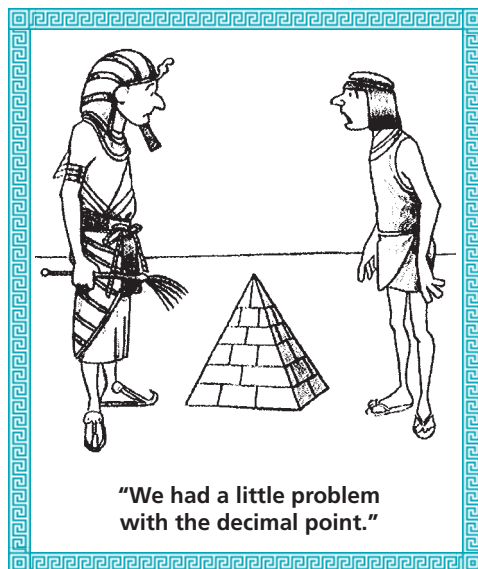
Practice and Problem Solving

A Practice by Example

Example 1 (page 416)

- The base of the pyramid at the right is a square whose sides measure 0.675 m. The intent was for the sides to measure 675 m. What is the ratio of the length of a base side in the small pyramid to the length of a base side in the intended pyramid?

- Models** The Leaning Tower of Pisa in Italy is about 185 ft tall. A model of the Leaning Tower is 6 in. tall. What is the ratio of the height of the model to the height of the real tower?



Example 2 (page 417)

If $\frac{a}{b} = \frac{3}{4}$, complete each statement.

3. $4a = \square$

4. $\frac{b}{a} = \square$

5. $\frac{a}{3} = \square$

6. $\frac{4}{3} = \square$

7. $\frac{4}{b} = \square$

8. $3b = \square$

9. $\frac{a+b}{b} = \square$

10. $\frac{a}{a+b} = \square$

11. $\frac{a+3}{3} = \square$

Example 3 (page 417)

Solve each proportion.

12. $\frac{x}{2} = \frac{8}{4}$

13. $\frac{9}{5} = \frac{3}{x}$

14. $\frac{1}{3} = \frac{x}{12}$

15. $\frac{5}{x} = \frac{8}{11}$

16. $\frac{4}{x} = \frac{5}{9}$

17. $\frac{5}{6} = \frac{6}{x}$

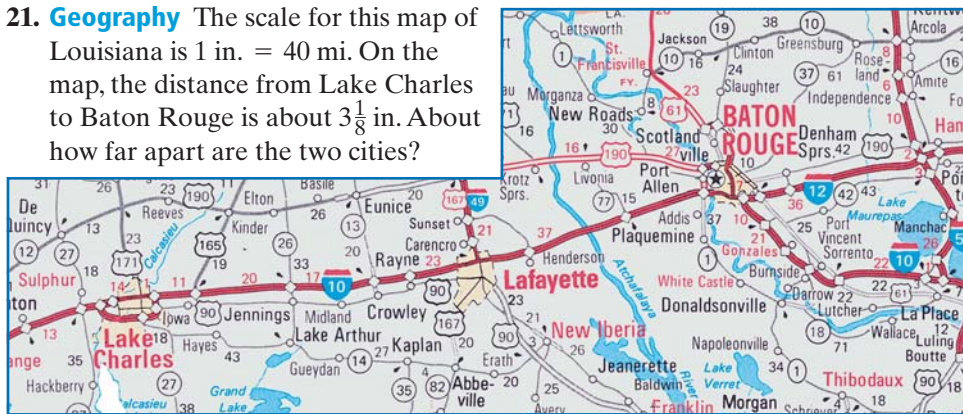
18. $\frac{x+3}{3} = \frac{10+4}{4}$

19. $\frac{x+7}{7} = \frac{15}{5}$

20. $\frac{3}{5} = \frac{6}{x+3}$

Example 4 (page 418)

- Geography** The scale for this map of Louisiana is 1 in. = 40 mi. On the map, the distance from Lake Charles to Baton Rouge is about $3\frac{1}{8}$ in. About how far apart are the two cities?



Need Help?

In Exercise 21 and other scale problems, use mental math to estimate the answer first.

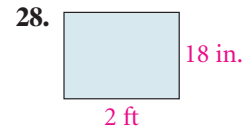
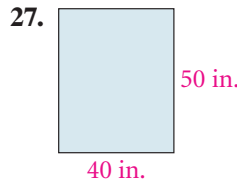
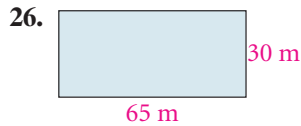
Map Reading Measure the map distance. Then find the actual distance.

22. Morgan City to Rayne 23. Vinton to New Roads 24. Kaplan to Plaquemine

25. **Design** You want to make a scale drawing of your bedroom to help you arrange your furniture. You decide on a scale of 3 in. = 2 ft. Your bedroom is a 12 ft-by-15 ft rectangle. What should be its dimensions in your scale drawing?

B Apply Your Skills

For each rectangle, find the ratio of the longer side to the shorter side.



29. **Miniatures** The diameter of a dinner plate is 1 ft. In a dollhouse set, the diameter of a dinner plate is $1\frac{1}{4}$ in. What is the ratio, using whole numbers, of the diameter of the dollhouse plate to the diameter of the full-size plate?

Complete each statement.

30. If $\frac{x}{7} = \frac{y}{3}$, then $\frac{x}{y} = \frac{\square}{\square}$.

31. If $4m = 9n$, then $\frac{m}{n} = \frac{\square}{\square}$.

32. If $\frac{30}{t} = \frac{18}{r}$, then $\frac{t}{r} = \frac{\square}{\square}$.

33. If $\frac{a+5}{5} = \frac{b+2}{2}$, then $\frac{a}{5} = \frac{\square}{\square}$.

34. **Writing** Use a map in your classroom or a map from a textbook. Give the scale of the map. Explain how to use a ruler and the scale of the map to approximate an actual distance. Give an example. (If you do not have access to another map, use the map above.)

Solve each proportion.

35. $\frac{y}{10} = \frac{15}{25}$

36. $\frac{9}{24} = \frac{12}{n}$

37. $\frac{11}{14} = \frac{b}{21}$

38. $\frac{5}{x-3} = \frac{10}{x}$

39. $\frac{8}{n+4} = \frac{4}{n}$

40. $\frac{2b-1}{5} = \frac{b}{12}$

41. $\frac{2}{7} = \frac{x-5}{x}$

42. $\frac{3y-5}{y} = \frac{12}{5}$

43. **Models** The sandwich shop at the left is 40 ft tall. The shop is an enlargement of an actual milk bottle. The scale used in construction is 5 ft = 2 cm. Find the height of the actual milk bottle.

44. **Geography** Students at the University of Minnesota in Minneapolis built a model globe 42 ft in diameter using a scale of 1 : 1,000,000. About how tall is Mount Everest on the model? (Mount Everest is about 29,000 ft tall.)

Complete each extended proportion.

45. $\frac{8}{12} = \frac{6}{\square} = \frac{12}{\square}$

46. $\frac{\square}{15} = \frac{15}{25} = \frac{\square}{20}$

47. $\frac{14}{\square} = \frac{\square}{12} = \frac{35}{20}$

48. **Games** Choose a scale and make a scale drawing of the playing region.

48. A pool table is 5 ft by 10 ft.

49. A bowling lane is 3.5 ft by 60 ft.

50. A basketball court is 92 ft by 50 ft.

51. A football field is 160 ft by 120 yd.

52. **Error Analysis** One rectangle has length 3 in. and width 4 ft. Another rectangle has length 3 ft and width 4 yd. Elaine claims that the two rectangles are similar because their corresponding angles are congruent and their corresponding sides are in proportion. Explain why Elaine's reasoning is incorrect.

If $\frac{a}{b} = \frac{c}{d}$, complete each statement.

53. $\frac{a+b}{c+d} = \frac{\square}{\square}$

54. $\frac{a+c}{b+d} = \frac{\square}{\square}$

55. $\frac{a+2b}{b} = \frac{\square}{\square}$

C Challenge x^2 **Algebra** Justify the indicated property of proportions.

56. Property (2): If $\frac{a}{b} = \frac{c}{d}$, then $\frac{b}{a} = \frac{d}{c}$.

57. Property (3): If $\frac{a}{b} = \frac{c}{d}$, then $\frac{a}{c} = \frac{b}{d}$.

58. Property (4): If $\frac{a}{b} = \frac{c}{d}$, then $\frac{a+b}{b} = \frac{c+d}{d}$.

Solve each extended proportion for x and y with $x > 0$ and $y > 0$.

59. $\frac{x}{6} = \frac{x+10}{18} = \frac{4x}{y}$

60. $\frac{x}{5} = \frac{9}{y} = \frac{y}{25}$

61. $\frac{1}{x} = \frac{4}{x+9} = \frac{7}{y}$



Standardized Test Prep

Multiple Choice

Solve each proportion.

62. $\frac{21}{x} = \frac{7}{3}$

A. 3

B. 7

C. 9

D. 14

63. $\frac{4}{x-1} = \frac{1}{x}$

F. -3

G. $-\frac{1}{3}$

H. $\frac{1}{3}$

I. 3

64. $\frac{x}{x+6} = \frac{2}{3}$

A. 4

B. 6

C. 8

D. 12

65. $\frac{3}{8} = \frac{x+3}{9}$

F. $3\frac{3}{8}$

G. 3

H. $\frac{3}{8}$

I. $\frac{1}{3}$



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Web Code: afa-0801

Short Response

66. A map of Long Island has the scale $2.75 \text{ cm} = 16 \text{ km}$. On the map, Target Rock is 23.2 cm from Lake Montauk.

- Write a proportion that you can solve to determine the actual distance from Target Rock to Lake Montauk.
- Find the actual distance. Round your answer to the nearest kilometer.

Lesson 7-8

67. Probability A shuttle bus to an airport terminal leaves every 20 min from a remote parking lot. Draw a geometric model and find the probability that a traveler who arrives at a random time will have to wait at least 8 min for the bus to leave the parking lot.



68. Games A dartboard is a circle with a 12-in. radius. You throw a dart that hits the dartboard. What is the probability that the dart lands within 6 in. of the center of the dartboard?

Lesson 6-1

Graph each quadrilateral $ABCD$. Classify $ABCD$ in as many ways as possible.

69. $A(-1, -2)$, $B(3, -2)$, $C(1, 4)$, $D(-3, 4)$

70. $A(2, -1)$, $B(6, 2)$, $C(8, 2)$, $D(10, -1)$

71. $A(-7, 1)$, $B(-5, 3)$, $C(0, -2)$, $D(-2, -4)$

72. $A(1, 1)$, $B(-4, 4)$, $C(1, 7)$, $D(6, 4)$

Lesson 5-4

In each exercise, identify two statements that contradict each other.

73. I. $\triangle PQR$ is isosceles.

II. $\triangle PQR$ is an obtuse triangle.

III. $\triangle PQR$ is scalene.

74. I. $\angle 1 \cong \angle 2$

II. $\angle 1$ and $\angle 2$ are complementary.

III. $m\angle 1 + m\angle 2 = 180$

Write (a) the inverse and (b) the contrapositive of each statement.

75. If an angle is acute, then it has measure between 0 and 90.

76. If two lines are parallel, then they are coplanar.

77. If two angles are complementary, then both angles are acute.